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know scientifically of our species and forms of *Vitis* is directly due to Dr. Engelmann's investigations. His first separate publication upon them, "The Grape Vines of Missouri," was published in 1860; his last, a re-elaboration of the American species, with figures of their seeds, is in the third edition of the Bushberg Catalogue, published only a few months ago.

Imperfect as this mere sketch of Dr. Engelmann's botanical authorship must needs be, it may show how much may be done for science in a busy physician's *horæ subsecivæ*, and in his occasional vacations. Not very many of those who could devote their whole time to botany have accomplished as much. It need not be said, and yet perhaps it should not pass unrecorded, that Dr. Engelmann was appreciated by his fellow botanists both at home and abroad, that his name is upon the rolls of most of the societies devoted to the investigation of nature, that he was "everywhere the recognized authority in those departments of his favorite science which had most interested him," and that, personally one of the most affable and kindly of men, he was as much beloved as respected by those who knew him.

More than fifty years ago his oldest associates in this country — one of them his survivor — dedicated to him a monotypical genus of plants, a native of the plains over whose borders the young immigrant on his arrival wandered solitary and disheartened. Since then the name of Engelmann has, by his own researches and authorship, become unalterably associated with the Buffalo-grass of the plains, the noblest Conifers of the Rocky Mountains, the most stately Cactus in the world and with most of the associated species, as well as with many other plants of which perhaps only the annals of botany may take account. It has been well said by a congenial biographer, that "the Western plains will still be bright with the yellow rays of *Engelmannia*, and that the splendid Spruce, the fairest of them all, which bears the name of Engelmann, will still, it is to be hoped, cover with noble forests the highest slopes of the Rocky Mountains, recalling to men, as long as the study of trees occupies their thoughts, the memory of a pure, upright, and laborious life."

#### ARNOLD GUYOT.

ARNOLD GUYOT, Ph.D., LL. D., was born near Neuchâtel, Switzerland, September 28, 1807. His earlier studies were pursued at Neuchâtel, Stuttgart, and Carlsruhe. In his delightful memoir of his friend Agassiz, prepared for the National Academy, he gives a beau-

tiful picture of his first scientific studies. He subsequently studied theology for three years at Neufchâtel and Berlin, at the latter place attending the lectures of Neander, Hengstenberg, and Schleiermacher. His interest in scientific studies was increased by the Professors with whom he now came in contact, and the peculiar opportunities he enjoyed. Unwilling to enter upon the high duties of the Christian ministry with a divided mind, he turned aside from his theological course and devoted himself to science, a field more congenial to his taste, and, as he conscientiously believed, better adapted to his capacities.

He passed five years in Berlin in scientific study, attending the lectures upon physics, chemistry, meteorology, geology, mineralogy, physical geography, botany, and zoölogy, from such men as Dove, Erman, Mitscherlich, Weiss, Hoffman, Lichtenstein, Steffens, Ritter, and others. Portraits of Ritter, Steffens, and Humboldt he always kept upon the walls of his study, in memory of his student days. Upon the especial recommendation of Humboldt, he was granted free access to the Royal Botanical Gardens, and the chief gardener furnished him weekly with hundreds of cut specimens of the rarest exotics for his herbarium. To Steffens he owed much in philosophy, and a letter of Ritter, which was unfortunately lost some years since, bore testimony, not merely to the ability of the young student, but to the scientific position and attainments of the physical geographer who was second in this department of science only to Ritter himself. In 1835, Mr. Guyot received his degree of Ph.D. from the University of Berlin. He had spent five years in the family of Herr Müller, the Privy Councillor of King Frederick William III. He now removed to Paris and became the private instructor of the young sons of Count de Pourtales. By special arrangement, however, he continued his scientific studies, and also devoted himself to history, under Michelet. His summers were spent in scientific excursions in France, Belgium, Holland, Italy, and Switzerland.

As early as 1838 he discovered, and announced in a paper read before the Geological Society of France, most of the important laws concerning the formation, nature, and motion of the glaciers. He first discovered the laminated structure of the ice, and explained the blue and white bands; showed that the motion of the glacier is due to the displacement of its molecules, which constitute its plasticity and explain its moulding, &c. These discoveries were subsequently illustrated and confirmed by the investigations of Agassiz and Forbes; while he, with characteristic modesty, remained silent, and did not even publish his paper until 1883. In 1839, Mr. Guyot was ap-

pointed Professor of History and Physical Geography in the Academy of Neufchâtel, which was now upon a university basis. Agassiz was among his colleagues at this time. Here he delivered no less than thirteen different courses of lectures in connection with the two departments of which he had charge. Agassiz having taken up the glaciers with his usual enthusiasm, Professor Guyot entered upon an investigation of the erratic boulders, which had been neglected since the last observations of De Charpentier. During seven successive summers Professor Guyot conducted his investigations on both sides of the Central Alps in Switzerland and in Italy. From eleven different basins, covering a surface three hundred miles long and two hundred miles wide, he collected about six thousand specimens of rocks as vouchers of the results. One set of these specimens he placed in the museum at Neufchâtel; the other, he gave to the Museum of the College of New Jersey. From these specimens and his more than three thousand barometrical observations he was enabled to trace these boulders to their source in the mountains, and to determine the laws of their distribution and the coincidence of these with the laws of the moraines on the glaciers. The main results were published in the *Bulletin de la Société des Sciences Naturelles de Neufchâtel*, and in Comte d'Archiac's *Histoire de la Géologie*. He next made soundings in the Lake of Neufchâtel, and published a fine topographical map of its subaqueous basin.

After the political revolution of 1848, he came to this country and settled in Cambridge, Mass. He first became extensively known here by a course of lectures on "Comparative Physical Geography in its Relation to the History of Mankind," delivered before the Lowell Institute in Boston, in the winter of 1848-49. These were translated by Professor Felton, and published in the volume entitled "Earth and Man." He was employed for some years by the Massachusetts Board of Education to deliver lectures in the Normal Schools and before the Teachers' Institutes, and thus began the reform in the method of studying and teaching geography. In 1854 he was elected Professor of Physical Geography and Geology in the College of New Jersey, and removed to Princeton in 1855, where he continued to reside. He was also appointed lecturer in the State Normal School at Trenton. He delivered courses of lectures in the Theological Seminary at Princeton, in the Union Theological Seminary at New York, and before the Smithsonian Institution at Washington, D. C.

In addition to the discharge of his duties as Professor, he continued

the work which he had begun in New England, the barometrical measurement of the mountains. He not only measured the height of the White and the Green Mountains, the Adirondacks and the Catskills, but he investigated the physical structure and elevation of the entire Alleghany system. The results of these summer excursions appeared in papers prepared for the Smithsonian Institution, the American Association, and the National Academy; also in articles in Silliman's Journal, and in special maps. He first determined the true height of Mount Washington, of the Black Mountains in North Carolina, and of the Green Mountains in Vermont. He introduced into this country the improved barometers now employed, and organized the system of meteorological observations, first under the care of the Smithsonian Institution, which has now grown into the admirable "Signal Service." He prepared for the Smithsonian Institution the very extensive series of meteorological tables now so generally employed. It was from his suggestion that the first deep-sea soundings of the Atlantic were made by our government. He published a large series of Wall Maps, and a series of Geographies, which have revolutionized the study of geography in this country. He was the author of the Introduction to Johnson's Physical Atlas, and was one of the editors of Johnson's Cyclopædia. His Maps and Geographies received the gold medal, the highest honor awarded, at Paris in 1878; and the medal of progress, a special honor, was given him at the exhibition at Vienna, in 1873. He was a member of the National Academy in this country, was an Honorary Member of the Geographical Society of France, and an Associate Member of the Royal Academy of Turin and of numerous other societies. His last work was "Creation, or the Biblical Cosmogony in the Light of Modern Science." It was finished only a few days before his death. He had been in declining health for several years, and died on February 8, 1884. In 1867 he married a daughter of the late Governor Haines, of New Jersey, who still survives him.

A simple extract from the minutes of the Faculty of the College of New Jersey will show the impression produced by him upon those with whom he came in contact, and this judgment is confirmed by numerous other testimonials:—

"His life-work was prosecuted with such intellectual vigor, indefatigable energy, conscientious fidelity, and distinguished success, that, among the eminent men of science of which the present age has been so prolific, the name of our departed colleague will ever occupy a conspicuous position. His character commanded the esteem of all within

the wide circle of his acquaintance. In deportment he was ever a model of propriety, dignified yet courteous, decided in his convictions yet modest in expressing them, considerate not only of the rights but of the feelings of all with whom he was associated, never unkind in word or act, and one of whom no one ever spoke or thought unkindly, singularly guileless and unselfish, a pure-minded, large-hearted, loving, and lovable Christian gentleman. His sincere, humble, childlike piety gave an attractive charm to all his conduct and conversation, and no one could be associated with him without feeling its elevating, refining, and ennobling influence. It was fitting that such a life should be crowned by the production of a work that will be prized by sincere seekers after truth respecting the works and the word of God, — an exhibition of the harmony of science and revealed religion."

#### ANDREW ATKINSON HUMPHREYS.

It falls to the lot of few men to encounter responsibilities so weighty and so diverse in character as those which rested upon General Humphreys at different periods of his long professional career; and of fewer still, to make of each new responsibility a new title to distinction.

Soldiers will most admire the general whose thoughtful intellect organized victory while others slept, and whose fiery energy led him into the thickest of the fight, until, like the heroes of mythology, he seemed to bear a charmed life.

Administrators will appreciate the skill displayed in systematizing the Coast Survey Office; in directing the Pacific Railroad explorations to a prompt and successful termination; and, after the war was over, in welding together the remnants of two distinct Corps of Engineers, and creating from them a united body fitted to meet the responsibilities devolved by law upon the organization.

Scientists will see his highest titles to fame in his personal investigations of the great questions involved in the construction of the Pacific Railroad; in the protection of the alluvial region of the Mississippi against overflow; in the deepening of the channels at the mouths of that river; and in the many other problems which engaged his attention before the cares of his high office as Chief of the Corps rendered it impossible to find leisure for such studies; — but they will also gratefully remember his appreciation of